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Dr. Nanda G. Pai
Professor (Addln.) and Head of
Department, Department of
Dentistry, Seth G. S. Medical
College and KEM Hospital
Mumbai, Maharashtra, India

Dr. Shrikala Acharya
Professor (Addln.), Department
of Community Medicine, Seth G.
S. Medical College and KEM
Hospital, Mumbai, Maharashtra,
India

Dr. Jinal Vaghela
Registrar, Department of
Dentistry, Seth G. S. Medical
College and KEM Hospital,
Mumbai, Maharashtra, India

Dr. Shubhangi Mankar
RMO, Department of
Community Medicine, Seth G. S.
Medical College and KEM
Hospital, Mumbai, Maharashtra,
India

Prevalence and risk factors of dental caries among school children from a low socio economic locality in Mumbai, India

Nanda G Pai, Shrikala Acharya, Jinal Vaghela and Shubhangi Mankar

Abstract

Objective: Dental caries is one of the most prevalent diseases among school going children and its prevalence is multifactorial. Only sporadic data is available on the oral health condition in different states in India. In a metropolitan city like Mumbai, no systematic assessment on the oral health problems is available, especially among the children belonging to low socio-economic class, studying in municipal schools. Hence the current study was planned to assess the prevalence of dental caries and its relation with various oral hygiene practices among the children studying in (V-VII Std.) suburban municipal school and predominantly from a low socio-economic area, located in the field practice area of a teaching medical college. Method: The present cross sectional study was conducted among 299 school children of the age 9 to 13 years using a pre-tested semi-structured questionnaire for face to face interview followed by oral examination by trained dental experts.

Results: The prevalence of dental caries was found to be 78.3%, higher among 10-11 years and among boys. Mean DMFT index was found to be 1.94 ± 1.70 . Statistically significant association was found among the oral hygiene practices and dental caries for daily brushing ($p < 0.001$), rinsing mouth after meals ($p < 0.0001$) and frequency of sweets consumption ($p < 0.0001$).

Conclusion: The high prevalence of dental caries warrants an urgent need for inculcating better oral hygiene practices among school children through active involvement of parents and teachers.

Keywords: Dental caries, eating sweets, oral hygiene practices, parental insistence, prevalence, cross-sectional study

Introduction

Dental caries is a significant yet preventable public health problem. It is the most common chronic disease of childhood that interferes with normal nutrition intake, speech, self-esteem and daily routine activities, resulting in under nutrition among children with abnormal cognitive development.

Only sporadic data is available on the oral health condition in different states in India and a single study done by Damle and Patel in Dharavi, Mumbai. [1] However, from the available studies, it can be estimated that a large range of school going children from 31.5 to 89%, is affected by dental caries in different part of the country. [2]

Besides, it has been seen that the prevalence of dental caries and other oral health morbidities are high in the lower socio-economic groups because of their poor oral hygiene practice, lack of awareness, improper food intake and family status. The school children from the lower socio-economic background also shows more decay and more missing teeth from previous disease compared with children from higher socio-economic levels.

It has been proven that schools can provide an ideal platform for promotion of oral health. At a global level, approximately 80% of children attend lower secondary school. [3] Schools can provide a supportive environment for promoting oral health and can be extremely helpful in spreading the right message to local community. Schools are the best centre for effectively implementing the comprehensive health care programme as children are easily accessible at school.

Materials & Methods

The present Cross-sectional study was conducted in a Municipal Public school located in Malwani- Malad, North Western Suburb of Mumbai city.

Correspondence

Dr. Jinal Vaghela
Registrar, Department of
Dentistry, Seth G. S. Medical
College and KEM Hospital,
Mumbai, Maharashtra, India

The area predominantly consists of population from low socioeconomic class, engaged in various unorganised service sector. Mumbai Municipal Corporation, the local self-governance body provides for primary education and healthcare services in the community. There are two municipal secondary schools with a total of 574 students studying from class V to class VII.

Sample size was calculated using formula $4pq/l^2$ [P=prevalence of Dental caries among children=54%, q =100-p = 46% and allowable error = 5.8]. Assuming 10% absenteeism & unwillingness to participate in the study by the children, sample size was calculated as 321. All the children studying in class V, VI, VII of the school, willing for participation with parents' written consent and present during the oral check-up were included in the study. A total of 299 students participated in the study.

Approval from Institutional Ethics committee and the school principal was obtained for conducting the study. A parent's meeting was called, the purpose of the study was explained to the parents and their consent was taken.

A pre-tested semi-structured questionnaire was used for face to face interview with the children for assessment of oral hygiene practices. Plain mouth mirror, ice cream sticks, and probe were used for clinical oral examination by team of dental surgeons. Recording of oral health examination included dental caries status, other related oral health morbidities and DMFT index.

All responses were tabulated using Microsoft-Excel 2007 Software for data analysis. Data was analysed by using SPSS software version 16.0. Statistical tools like mean, median, range, proportions and chi-square used as appropriate.

Results

In the study, 53.1% were boys and 46.9% were girls. Majority of the children were of 9 to 12 years and few children (10.4%) were above 12 years. 59.2% of children brushed their teeth daily and 18.4% twice daily. 72.2% children ate sweets daily with varying frequencies. 40.1% children gave history of

rinsing their mouth after meals. 78.3% parents insisted on their wards for daily brushing (Table 1).

Table 1: Sociodemographic Characteristics and Oral Habits of the Study Population

Sociodemographic profile	Frequency	Percentage
Age (in years)		
9-10	104	34.8
10-11	78	26
11-12	86	28.8
12-13	31	10.4
Sex		
Male	159	53.1
Female	140	46.9
Daily Brushing		
Irregular	67	22.4
Once	177	59.2
Twice	55	18.4
Eating Sweets Daily		
Irregular	83	27.8
Once	62	20.7
Twice	80	26.7
More than twice	74	24.8
Rinsing Mouth after Food		
Yes	120	40.1
No	179	59.9
Parents insistence on Brushing		
Yes	234	78.3
No	65	21.7

*Table depicting sociodemographic characteristics and oral habits of the study population.

Prevalence of dental caries was found to be 78.3% among the children. It was 80.8% among 9-10 year olds, 84.6% among 10-11 years and 69.8% among children of 11-12 years. Among the boys, 81.1% had dental caries in comparison to 75% among the girls. The difference in prevalence of dental caries among the age groups & both sexes was not statistically significant (Table 2).

Table 2: Prevalence of Dental Caries among School Children

Age (in years)	Dental Caries		Total	X ²	P
	Present (%)	Absent (%)			
9-10	84 (80.7)	20 (19.3)	104 (34.8)		
10-11	66 (84.6)	12 (15.4)	78 (26.1)		
11-12	60 (69.7)	26 (30.3)	86 (28.8)		
12-13	24 (77.4)	7 (22.6)	31 (10.4)		
Sex					
Male	129 (81.1)	30 (18.9)	159 (53.2)	1.64	>0.20
Female	105 (75)	35 (25)	140 (46.8)		

*Table showing prevalence of dental caries in school children as per their age and sex.

89.6% children with irregular brushing habits compared to 79.1% and 61.8% children with daily brushing habits, at least once or twice, had dental caries ($p<0.001$) (Figure 1). 75.6% using toothbrush suffered from dental caries in comparison to 89.4% children not using toothbrush. The association between using toothbrush and dental caries is statistically significant ($p<0.02$).

59% children, eating sweets less than once daily had dental caries compared to 86.2% children eating sweets more than once. The frequency of eating sweets is significantly associated with occurrence of dental caries ($p<0.0001$).

67.5% children practising rinsing of mouth after meals had

dental caries compared to 85.5% children not rinsing their mouth. Hence, rinsing of mouth after meals is found to be highly significant in preventing dental caries. ($p<0.0001$).

74.8% children with parental insistence on daily tooth brushing had significantly lower prevalence of dental caries compared to 90.8% children with dental caries with lax in parenting. The association between parent's insistence on daily brushing and dental caries is highly significant ($p<0.006$). Among the children with dental caries, 83.3% had their sibling also suffering from some dental problem and this association is found to be statistically significant ($p<0.016$) (Table 3).

Table 3: Association between Various Risk Factors and Prevalence of Dental Caries

Risk Factors		Caries		Total (%)	X ²	P
		Present (%)	Absent (%)			
Daily brushing of teeth	Irregular	60 (89.6)	7 (10.4)	67 (22.4)	13.83	<0.001
	Once	140 (79.1)	37 (20.9)	177 (59.2)		
	Twice	34 (61.8)	21 (38.2)	55 (18.4)		
Habit of using tooth brush	Yes	183 (75.6)	59 (24.4)	242 (80.9)	5.20	<0.02
	No	51 (89.5)	6 (10.5)	57 (19.1)		
Habit of eating sweets daily	Irregular	49 (59)	34 (41)	83 (27.8)	25.76	<0.000
	Once	55 (88.7)	7 (11.3)	62 (20.7)		
	Twice	69 (86.2)	11 (13.8)	80 (26.7)		
	More than twice	61 (82.4)	13 (17.6)	74 (24.8)		
Habit of rinsing mouth after meal	Yes	81 (67.5)	39 (32.5)	120 (40.1)	13.64	<0.000
	No	153 (85.5)	26 (14.5)	179 (59.9)		
Parental Insistence	Yes	175 (74.8)	59 (25.2)	234 (78.3)	7.638	<0.006
	No	59 (90.8)	6 (9.2)	65 (21.7)		
Dental Caries in Siblings	Yes	140 (83.3)	28 (16.7)	168 (56.2)	5.799	<0.016
	No	94 (71.8)	37 (28.2)	131 (43.8)		

*Table showing association between various risk factors and prevalence of caries.

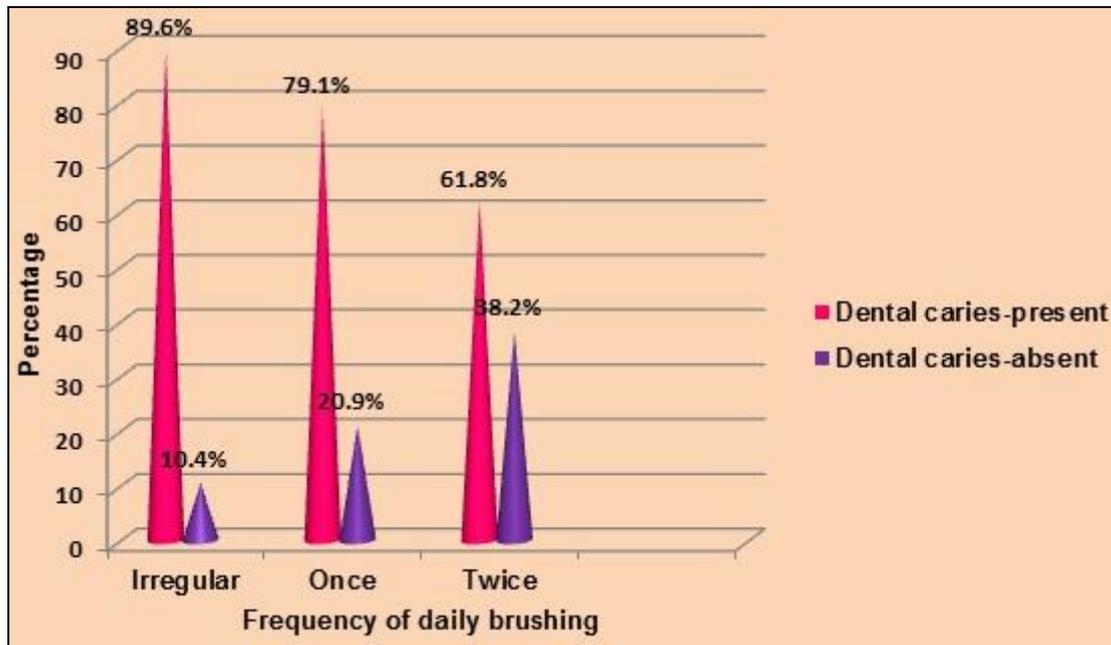


Fig 1: Showing the association between frequency of daily brushing and dental caries.

Mean DMFT in the present study among the children examined was found to be 1.94±1.70. Among the boys it was 1.84±1.64 and 2.05±1.76 among the girls. The mean DMFT varied from 1.89±1.73, 2.00±1.94, and 2.09±1.61 among 9-10years, 10-11 years & 11-12 years respectively (Table 4).

Table 4: Age and Sex Wise Distribution of DMFT Index

Age Groups	Mean DMFT		Mean DMFT
	Male	Female	All children
9-10 years	1.94±1.69	1.85±1.78	1.89±1.73
10-11 years	1.61±1.71	2.43±2.10	2.00±1.94
11-12 years	2.04±1.70	2.18±1.48	2.09±1.61
12-13 years	1.50±1.03	1.53±1.24	1.52±1.12
All Ages	1.84±1.64	2.05±1.76	1.94±1.70

*Table showing age and sex wise distribution of DMFT Index among the school children.

Discussion

Dental caries is one of the leading diseases among school going children. WHO reported 60-90% of school children worldwide has experienced caries with the disease being most prevalent in Asian and Latin American countries. [4] It is the most prevalent disease among school going children and its

prevalence is multifactorial depending on age, sex, socioeconomic status, geographical location, food habits especially sugar/sucrose consumption and oral hygiene habits. In our study, the overall prevalence of dental caries was high 78.3%, the highest being 84% among the 10-11 years old and 82.9% in 9-10 year olds. These results were similar to studies reported by Rao *et al* who reported prevalence of 76.9% among 5-12 year olds. [5] and Shingare *et al* who reported prevalence of 80.92% among 3-14 year olds. [6] Similar high caries prevalence was found in studies done in Mangalore city by Sudha P [7] *et al* 82.5% and Dharavi Mumbai by Damle *et al*. [1] 79.48%. In a study done in the Sunderbans, the caries prevalence was 82% and it increased with age. [8] However, the prevalence was much lower in studies by Misra and Shee [9] 60.41% and Chopra *et al*. [10] 61.88%. In the present study the boys showed slightly higher prevalence as compared to girls (81% as against to 75%). This is similar to finding by Mahesh P *et al*, [11] Rao *et al*, [5] Sarvanan *et al*, [12] Sudha P *et al*, [7] Vacher [13] and Auckland & Bgel Karoey *et al*. [14] On the contrary, girls were found to have higher caries prevalence by Misra and Shee, [9] Gaikwad and Indurkar [15] and Singh & Saimbi *et al*. [16] This variation could be attributed to

difference in age groups and the geographical locations studied in the surveys.

It was observed that those who brushed twice a day had less prevalence of dental caries as compared to those whose brushing habit was either once daily or not every day. These findings were similar to findings of David J *et al.*,^[17] Moynihan P *et al.*^[18] and Dhar V *et al.*^[19] In a study by Datta *et al.* 47.4% students who brushed twice a day had caries as compared to 76.84% of students having habit of brushing either once daily or not every day.^[8] In a study by Shailee *et al.* in Shimla city-Himachal Pradesh, they found that as the frequency of brushing increased, the prevalence of dental caries decreased.^[20]

In our study, there was a strong correlation between sugar consumption and caries prevalence, increasing with increasing sugar exposure. The findings of the present study reconfirm the importance of sugar (sucrose) as one of the prime etiological factors which are consistent with findings of Gupta A *et al.*,^[21] Kalsbeek and Verrips,^[22] Mohit Kumar *et al.*^[23] Strong correlation between sugar Consumption and caries development was also seen by Shetty and Tandon.^[24] In a study conducted by Vishwanath and Sabu in North Bangalore, they tried to find the type of sugar consumed and concluded that hard candies are more risky in causing dental caries than soft drinks or ice cream.^[25] However, this was exactly opposite to the findings of Weissenbach *et al.*^[26] and Hashizume LN *et al.*^[27] who found no association between consumption of sugary snacks and beverages and dental caries.

Practice of rinsing the mouth after food was found beneficial with low caries prevalence. This is also been reported by Kapoor *et al.*^[28] and Datta *et al.*^[8] who found that 56.41% of students having habit of rinsing mouth after food had caries as compared to 80% of students who did not rinse mouth after food. Parental insistence on tooth brushing was found to be significantly associated with prevalence of dental caries among the examined school children. Similarly, history of dental caries among siblings was found to be significantly associated, implying clustering of dental caries in families with poor oral hygiene habits and important role of parents in inculcating good oral hygiene habits.

In our study, Mean DMFT index was found to be 1.94 ± 1.70 , slightly higher among girls 2.05 ± 1.76 compared to boys 1.84 ± 1.64 . A retrospective analysis of dental caries by Kundu *et al.*^[29] also found mean DMFT for 12 years age group for Northern region to be 1.90 ± 4.42 . A World Health Organisation estimation of global DMFT for 12 years old children reported that in the 188 countries included in their database, that on a global basis 200, 335, 280 teeth were decayed, filled or missing among just that age group.^[30] Hence, WHO continues to advocate that efforts to improve the overall situation are still highly indicated.

Conclusion

Despite scientific advances and the fact that it is a preventable disease, dental caries continues to be a major public health problem. Its high prevalence among school children is not only a medical problem but also a social issue. Inculcating good oral hygiene habits of regular brushing, less sugar intake, mouth rinsing after meals through active involvement of parents and teachers can go a long way in reducing dental caries. Regular dental health examinations should be conducted in all schools with consistent follow-ups. Health education should be incorporated within the regular activities of the school. Parents should be made aware of the dental

health of their children with regular parent - teacher meetings during which the importance of good hygiene practices in disease prevention should be highlighted.

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